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ABSTRACT

The process used by Utah State University to equalize faculty women's salaries is examined. In 1972-73, Utah State University administrators began a discussion of the variables affecting faculty salaries. The university adjusted the faculty women's salaries until no statistically significant differences by rank were found. The analysis of salary differentials between men and women faculty was performed through use of a multiple regression technique. Lump sum allocations were made available to each college for the purpose of equalizing the salaries of faculty women. The allocations were based upon the results of the regression analysis, and the use of the allocations proposed by the respective deans were then studied using both the regression analysis results and qualitative assessments of faculty performance made by the deans. After the proposed salaries were computerized, the rerun of the regression analysis model showed significant improvement of the inequities. At the end of the third year, no statistically significant differences between men's and women's salaries remained. A review of the literature on salary equity models is included. Future plans for expansion of the regression analysis model to enhance its utility as a management tool are to incorporate productivity factors and supply and demand rankings for more objective salary administration. (SC)

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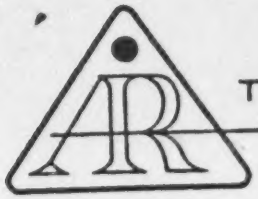

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EQUALIZING FACULTY WOMEN'S SALARIES:

A CASE STUDY IN COOPERATION

Paper

Presented at the 19th Annual Forum

of

The Association for Institutional Research

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ABSTRACT

In 1972-1973, Utah State University (USU) administrators began a discussion of the variables affecting faculty salaries because of recent federal legislation affecting the employment of faculty and pressure by a new organization of women faculty. Amicable cooperation between the administration and the faculty women's committee, and special funding by the State Legislature, made it possible for USU to adjust faculty women's salaries until no statistically significant differences by rank were found. The analysis of salary differentials between men and women faculty was performed through use of a multiple regression technique. Consideration is now being given to expanding the model's use as a management tool so that it can examine productivity and supply and demand factors as components of faculty salaries.

EQUALIZING FACULTY WOMEN'S SALARIES: A CASE STUDY IN COOPERATION

Introduction

For the first time, the Educational Amendments Act of 1972 brought faculty in colleges and universities under federal laws which mandated equal employment opportunity. Before 1972, institutions of higher education had been exempted from the provisions of Title VII of the Civil Rights Act and the Equal Pay Act; and though the American Association for University Professors had annually chronicled the salaries of faculty by academic rank and type of institution, not much attention had been paid to the continuing and pervasive salary differentials between men and women faculty (Greenfield 1977, p. 42; and McLaughlin, Smart, and Montgomery 1978, p. 67). During the seventies, fiscal constraints and litigation with regard to charges of salary discrimination have created an increasing sensitivity to salary reward criteria and equity in faculty compensation. The literature reflects this growing concern. Numerous studies continue to proliferate which examine differentials based on sex in faculty salaries from the perspective of a particular discipline, a small number of variables, or a single institution of higher education (McLaughlin et al 1978, pp. 67-68).

These studies have tended to focus on the variables used to determine faculty salaries and methods for assessing salary equity. In contrast, we will examine the process whereby faculty women's salaries were equalized at Utah State University (USU). We feel that

USU's approach to salary equalization has been unique for the following reasons: (1) change theory was used to develop a process for equalization which involved the cooperation of women faculty, department heads, deans, and the central administration in joint decision-making. Thus, confrontation and external intervention were avoided. (2) USU's Department of Applied Statistics and Computer Science successfully adapted a routine statistical tool to a unique set of variables in order to provide the necessary data for informed decision-making. (3) The model has been used continuously since 1973 to monitor faculty salaries for equity and provide a mechanism for making additional adjustments. USU's approach to salary equalization has been different from that in use at other institutions. At Montana State University, for instance, communication and collaboration between organized faculty women and the administration followed a court order mandating that the two groups reach a negotiated settlement with regard to discrimination against women faculty in pay and promotion (Clark 1977, pp. 233-34).

This paper is organized into three major sections. The first section shows how change theory was applied to the process followed at USU to equalize faculty salaries. The second section briefly reviews the literature on salary equity models, describes the model used at USU, and projects future uses of the model in management decision-making. The final section delineates the outcomes of the use of the model.

I. A Cooperative Approach to the Development and Use of a Regression Analysis Model for Evaluation of Salary Differentials

Innovation theorists Hefferlin (1969), Havelock and Havelock (1973), and Rogers and Shoemaker (1971), agree that successful institutional change is not a haphazard phenomenon; it is the result of planned, premeditated action. Change, according to these theorists, occurs because change agents become aware that a need exists for a certain innovation within a social system. Their role is to diagnose the problem, create an intent to change in the institution, and help translate the intent into action. Due to their efforts, the new idea receives increased attention by members of the social system, and becomes incorporated into a specific plan of action that is adapted to the conditions of the institution. Next, the new idea is sanctioned by leaders who are representatives of the institution's norms and values, and whose support is crucial to the adoption of an innovation. It is these leaders who complete the next phase of the change process by making the decision to act on the plans. In order for the innovation to be successful, all members of the institution who participated in the change and are impacted by it must accept its merits. A self-initiated and self-applied innovation will have the strongest user commitment and best chances for long-term survival (Gappa and Eastmond 1978, pp. 278-280).

Awareness of a Need for Change

The inclusion of institutions of higher education in federal equal employment opportunity legislation, and the distribution of

regulations requiring federal contractors to have affirmative action programs precipitated an awareness of a need for change at USU. Two different groups became aware of the salary differentials between men and women faculty during 1972.

While in the process of preparing the affirmative action program, USU's top management began an assessment of potential problem areas. An examination of faculty salaries showed gross average differentials between the salaries of men and women faculty by rank, but did not indicate the reasons for them. A rough approximation of the amount of money necessary for salary adjustments was made in order to ask for special funds in the regular budget request to the Board of Regents and State Legislature for the 1973-1974 fiscal year. It was the first request for equalization monies to correct salary differentials based on sex by a state institution of higher education in Utah.

At approximately the same time, several faculty women at USU obtained data on the average salaries of men and women faculty by rank at their institution. In a speech to the faculty in one of the colleges at USU, a high-ranking faculty woman discussed the salary differentials by sex. Women faculty members, aroused by this speech and increasingly aware of the new laws affecting higher education, organized themselves into an Ad Hoc Committee on the Status of Women. In early meetings of the Committee, a strategy of cooperation rather than confrontation was adopted as the best approach to use in order to accomplish the members' objectives. This strategy was the result of strong leadership among the women. These leaders possessed a sophisticated knowledge about change processes, considerable experience

in working cooperatively within an organization, and a friendly relationship with the central administration. Their first action was to meet with the President to inform him that they had organized, elected officers, wished to be recognized formally as a University committee, and wanted to assist the administration with the preparation of its affirmative action plan. Because of their strategy and the President's leadership style, they found him very receptive to their ideas.

Upon appropriation of the requested equalization money by the State Legislature, the President delegated to the Vice-Provost the responsibility for allocation of the funds. The Ad Hoc Committee immediately initiated a meeting with the Vice-Provost to state their desire to assist the University with its equalization plans now that a special fund was available for that purpose. The cooperative nature of the meetings that followed and the willingness of both groups to listen to and learn from each other set the stage for implementation of the salary equalization process.

Development of a Specific Plan of Action

Three factors were crucial to the successful development of a plan of action: (1) the willingness of the central administration to meet with and accept the recommendations of the newly organized Ad Hoc Committee; (2) the decision of the Ad Hoc Committee to adopt a strategy of working collaboratively with the administration in accomplishing the salary equalization; and (3) the fact that special funds had been appropriated for equalization. This last factor eliminated the potential for confrontation that could have occurred if special funds had not been available to meet the University's legal requirement to equalize salaries.

The second meeting of the Ad Hoc Committee with the Vice-Provost was concerned with the identification of the variables to be considered in the salary analysis. Using the variables recommended by the Ad Hoc Committee, the Vice-Provost worked with the Office of Institutional Research to determine what data were readily available and with the Head of the Department of Applied Statistics and Computer Science in the development of a statistical methodology. Simultaneously, the members of the Ad Hoc Committee conducted a telephone survey of institutions across the country to see how they were approaching the problem of faculty salary equalization.

In subsequent meetings between the administration and the Ad Hoc Committee it became increasingly apparent that the salary equalization process would be the result of joint decision-making, and that the recommendations of the faculty women would be accepted and used as planning progressed. Joint decisions that were made included the variables to be used in the salary analysis, the use of regression analysis as the statistical technique to determine how to allocate the funds, and the process to be followed in the allocation. Thus, the confrontation that other campuses have experienced was avoided, and collaboration between the central administration and the Ad Hoc Committee was assured.

While the Department of Applied Statistics and Computer Science developed the regression analysis model and the Office of Institutional Research gathered and keypunched the data, the Vice-Provost requested that the deans of the three colleges containing the majority of faculty women provide a qualitative assessment of the productivity of

each faculty member through a forced choice merit ranking. When the results of the regression analysis model were available, it was found that the relationship between residual differences in the regression analysis and the dean's assessment of the productivity of the individual faculty member were highly correlated in two colleges. In the third and largest college the correlations between the residuals and the dean's rankings were not as predictive; it was assumed that this was because the college was so large that the dean was not as familiar with the work of individual faculty members.

At the next meeting of the Vice-Provost and the Ad Hoc Committee, its members were shown the results of the regression analysis by faculty rank. The women then worked with the Vice-Provost to determine the best method of allocating the funds based upon their knowledge of the total amount available, the amount of dollars by rank that women's salaries were below the average salaries of men, and the total number of women to be affected by the equalization. A method to allocate the existing funds was agreed upon. With the agreement of the Ad Hoc Committee, the Vice-Provost then recommended a formal process for salary equalization to the President, which he accepted.

Implementation of the Salary Equalization Process

The process provided that the deans of the eight academic colleges would first complete their annual budget projections for the forthcoming fiscal year according to customary and well-understood procedures. After the deans had submitted their proposed budgets for the next fiscal year, lump sum allocations were made to each college

for the specific purpose of equalizing the salaries of faculty women. These lump sum allocations were based upon the results of the regression analysis. The deans were asked to make decisions regarding the use of the equalization funds with the assistance of their department heads and to submit their proposed use of the money with a supporting rationale to the Provost's Office The proposed uses of the allocated funds were then studied by the Vice-Provost, using both the regression analysis results and the qualitative assessments of faculty performance which the deans had made. In some cases, the deans were asked to raise their proposed allocation of the equalization monies because their proposals did not coincide with either the regression analysis results or their qualitative assessments. In other cases, it was determined that the low salary of the woman faculty was due to performance, and no adjustment (or a lesser adjustment than indicated) was made. After the deans' recommendations were agreed upon by the Vice-Provost, the proposed salaries for the women faculty were computerized and the regression analysis model rerun. The results showed significant improvement, but not a complete correction of the inequities. These results were shared with the Ad Hoc Committee on the Status of Women.

Because of the lack of funds to completely correct the differentials in women's and men's salaries in the 1973-1974 budget year, an identical process was followed the next year when additional funding was approved again by the Legislature. At the end of the second year, the differential between men and women faculty salaries had diminished to the point where a special request to the Legislature was

no longer necessary. Further equalization of salaries was accomplished using University funds during the third year. The results of the regression analysis at the end of the 1975-76 year showed no statistically significant differences between men's and women's salaries based upon rank. Reruns of the model during the two subsequent years have continued to show a differential between men and women faculty salaries, but this differential has not been statistically significant. Its persistence, however, indicates a continuing need for evaluation of individuals' salaries.

Acceptance of the Salary Equalization Process

The success of the salary equalization process can be attributed to the fact that the regression analysis methodology and the process used to allocate the funds were accepted by the faculty women who were impacted by the change, and by the deans who were responsible for making decisions in their colleges regarding use of the funds. Faculty women had participated in all stages of the development and implementation of the salary equalization plan. Although the faculty women had taken the initiative, the central administration was willing, in fact, eager, to have them participate fully in the decision-making process. This was due to the recognition by the central administration that the well-informed faculty women could make a significant contribution to solving the problem, and to their desire to avoid a costly confrontation with them. In addition, money was available for salary equalization. Without supplemental funds, decisions would have been far more difficult to make. Finally, the salary equalization process was self-initiated and self-applied, without interference by federal agencies or the courts. These factors have given the regression analysis model and the salary equalization process wide acceptance and credibility within the University.

II. The Regression Analysis Model

Review of the Literature

Due to the individuality of assignment among faculty members, salary setting procedures are often ad hoc, subjective, or discretionary; the precise criteria used may be secret, unknown, or inexplicit. Such subjectivity can open the door to discrimination, and invites close judicial scrutiny. This is evident in the large numbers of salary complaints filed by women (Greenfield 1977, p. 47); and in the 1976-1977 findings of the American Association of University Professors which show that male-female differentials in the average real compensation of faculty have persisted over the past ten years (Beaumont 1978, p. 19).

While faculty share certain common characteristics (for example, educational qualifications and standard academic ranks), there is also a high degree of individuality in the work of a given faculty member. Faculty have a bewildering array of tasks: teaching, counseling students, supervising dissertations, working on committees, performing administrative duties, writing books and articles, directing research laboratories, giving seminars and public lectures, recruiting, consulting, and vying for research grants. Therefore, any given faculty member's assignment may be considerably different from others in his/her department or discipline. Because of the diversity of functions, backgrounds, and disciplines, studies have isolated as many as 32 variables that could affect the salary of faculty (Greenfield 1977, pp. 46-52).

Institutions of higher education across the nation have taken steps to study faculty salaries for sex differentials and to correct

differentials where necessary. Interest in the topic has led to numerous articles documenting methodologies used. Interest has become so great that in 1977 the American Association of University Professors published its Higher Education Salary Evaluation Kit which contains three separate bibliographies documenting general salary studies, studies by institutions, and studies by professional societies (Scott 1977).

All these studies incorporate one form or another of "simulated matching" as the basic methodology (Tanur and Coser 1978, p. 26). In enforcement of the Equal Pay Act, the courts have determined equality of skill, effort and responsibility by listing and comparing the tasks actually performed by matched pairs of women and men. The matched pairs methodology was used at Montana State University after a court decision (Clark 1977, pp. 233-48). However, the main defect in the concept of matching is the difficulty of finding appropriate male/female matches due to the diversity of tasks associated with faculty work and the need to measure the quality of performance. In addition, the plaintiff lacks the chairman's superior knowledge of the talents and experiences of all persons in the department. Thus, he/she could deny the plaintiff's matches or could name matches which reflect his/her bias. What is needed for faculty salary assessment is a method that compares the salaries of men and women who do not perform equal work, and that can quantify the relationship between salary and the various items used to measure skill, effort, and responsibility (Greenfield 1977, p. 49).

Because of the difficulties inherent in using matched pairs, most institutions are using some form of multiple regression analysis which

is a flexible technique, allowing the study of any number of variables for their impact upon salary. A predictive equation produces an "expected" salary for a white male faculty member, generally in a given department or college. From this predictor equation for the white male group, a predicted salary, using the same set of variables, can be generated for white females, and/or minority males and females. These predicted salaries are then matched with the actual salaries, giving a measure of discrepancy for each individual. If the actual salary is less than the predicted, that difference (the individual's residual) will be negative. This can be interpreted to indicate that the individual is receiving less money than would be expected for a white male of identical attributes. If the average residual for the group being examined for discrimination is statistically significantly negative, this can be taken as evidence of the <u>possibility</u> of patterned salary inequity (Tanur and Coser 1978, p. 26). However, while successful in pinpointing the possibility of salary inequity, multiple regression analysis cannot take the place of detailed examination of the actual individuals thus identified.

Just as there are deficiencies in the use of the matched pairs technique for faculty salary evaluation, so there are deficiencies in the use of multiple regression analysis. It is essential that those responsible for performing the analysis and interpreting the results understand the strengths and limitations of the multiple regression technique and what the findings mean. For example, attention is focused upon average discrepancies for groups. This can obscure important "pockets of poverty," i.e., individuals whose negative contribution

to the average is hidden by the presence of relatively more "affluent" individuals. Tanur and Coser's study found that length of service, rank, and the proportion of women in the field tended to be variables which caused "pockets of poverty" (1978, pp. 27-31). Certainly, multiple regression analysis is not an appropriate technique to use if (1) selected predictor variables are not related to salary or the relationship is not linear; (2) the observed values of the predictor variables for women are outside of the range of those for men; (3) the number of faculty is too small. The smaller the sample, the wider the confidence interval. As the Equal Employment Opportunity Commission has suggested a 95 percent level of certainty, the matched pairs method should be used when the number of faculty is too small for multiple regression analysis (Greenfield 1977, pp. 53-56).

Use of the Multiple Regression Technique at Utah State University

From the preliminary list of potential variables developed by the Ad Hoc Committee and the Vice-Provost, the Office of Institutional Research determined which variables could be used most efficiently because of the relative ease of capturing the data. The variables considered were the length of time of employment at USU, highest degree earned, academic department and college, rank, title of position (if different from rank), date of award of present rank, tenure status, particular assignment (teaching, research, extension, administrative, or other), sex, race, and age. All of these variables were subsequently used in the regression analysis model except for the date of award of present rank. This information was not available in personnel records,

and a survey of the faculty found that in many cases the individuals themselves did not have the information. The University budget was used as a control document for most of the variables. The remainder (age, sex, race, and length of time of employment at USU) were available from personnel records. The assignments for each individual faculty member were calculated as a percentage of a full time equivalent, based upon accounting codes used in the budget. Only full-time faculty having some form of academic duties were included in the sample of 639 faculty members. All salaries were adjusted to a nine-month base.

The majority of the variables were categorical in nature and were introduced into the model by means of dummy variables (Draper and Smith 1966, Hurst 1970). The lone quantitative variable was date of employment; it was introduced into the model as the year of employment and its square. A curvilinear relationship was expected between salary and date of employment.

The computer program lists the observed and predicted values and the deviations. In scanning the deviations from predicted values, several data errors were discovered and corrected, an unexpected benefit from the model.

The resulting analysis of variance from the first run of the model is presented in Table 1. The dominant variables found to affect salary were the level of degree, academic rank, sex, position, research assignment, other assignments, and college. The date of employment, tenure status, race, and extension assignment were not significant. The coefficient of determination (R^2) was .81; therefore, 81 percent

of the variability in salaries could be explained by the model. This coefficient of determination has been very stable. For example, in 1977-78 it was .77. The residual standard deviation was 1515. Using a normality assumption, two-thirds of the deviations should be less than 1515 in absolute value. The results appeared to be in satisfactory agreement with the normality assumption, although a frequency distribution was not prepared.

The model effects indicated that the differences due to race were not significant, with minorities actually receiving preferred treatment. The effects due to sex were significant and important. A program was written to add the following increments to the salaries of women faculty: Professors, $900; Associate Professors, $0; Assistant Professors, $325; Instructors, $485; and Lecturers, $900. The revised data were then run through the same model. Only the rank-by-sex portion of the analysis of variance and estimated effects was changed. The revised effects were as follows:

	Male	Female
Professor	3977	3727
Associate Professor	976	1232
Assistant Professor	-639	-675
Instructor	-2538	-2594
Lecturer	-1316	-2150
Average	92	-92

The fact that the other effects were not changed is convincing evidence that the model estimated what it was purported to estimate. The other estimated effects were very clearly evaluated independently of the sex-by-rank picture.

Using the regression analysis model, salaries of female faculty members were adjusted over three consecutive years. Annual reruns of the model in the past two years have shown that the differences in salary due to sex were not statistically significant. However, salary variations between the sexes, while not significant, continue to require annual analysis and examination of individual cases.

Future Direction for USU's Salary Regression Analysis Model

Future plans for expansion of the model to enhance its utility as a management tool are to incorporate productivity factors and supply and demand rankings for more objective salary administration.

The current model does not contain any variables which explicitly measure faculty productivity or the quality of faculty performance. There are indirect measures of productivity in the position, rank, assignment and tenure variables, but these do not account for the great ranges in performance within the same categories of these variables. Some data on the factors that department heads and deans are considering when they set individuals' salaries can be obtained. Variables that could be used are quality assessments such as peer review, student evaluations, or administrative review. Other productivity variables that could be included are refereed and non-refereed publications and presentations; number of graduate students directed; departmental, college and university committee assignments; student credit hours taught; number of undergraduates advised; grant monies obtained; memberships in professional associations; and professional meetings attended.

The deviations found when using the current model could be matched against the performance variables selected for inclusion in the model. This could lead to an understanding of the productivity factors that are being used in salary determination. These factors could then be directly incorporated into the model by creating one or more quality indices. The model would then be able to demonstrate to deans and department heads the productivity factors they are using in making salary decisions. Such knowledge would enable administrators to view salary rewards more objectively. Simultaneously, such information could be helpful to faculty who wish to become more productive, but do not know what the criteria are for advancement.

Secondly, the current model accounts for the supply and demand factor in the various academic disciplines only at the college level. (Departments are not a variable because the number of white male faculty in a given department is frequently too small for the regression analysis technique to be used with accuracy.) However, some colleges have wide ranges in supply and demand. Thus, in these colleges, there may be wide fluctuations in salary from discipline to discipline and even within some disciplines. The model could be considerably improved by placing each faculty member in an appropriate professional group, which would then be ranked according to supply/demand information.

III. Outcomes of Using the Salary Regression Analysis Model

The results of this procedure have been very beneficial, due to the involvement of concerned groups and individuals in making decisions regarding the development of the model and the process whereby salaries were adjusted, and to the predictive capabilities of the model.

First, the salary regression analysis model provided objective answers to questions raised by department heads and deans about the reasons underlying the differentials between men's and women's salaries found in the computation of the gross averages. By giving the deans the data generated by the regression analysis model and asking them to make salary adjustments for women faculty members within their college, they became part of the decision-making process. In order to determine how to allocate the funds, deans and department heads had to analyze the reasons for salary differences. The result has been better evaluation of the salaries of both men and women faculty within departments and colleges. That deans and department heads have been inclined to correct imbalances using their regular appropriations is evident from the fact that no statistically significant differences by sex have been found since 1974-1975.

Secondly, the open communication and trust achieved between the organized women's group and top management has set precedents. Because of the initial participation in decision-making by faculty women, there have been no externally filed salary complaints. Collaboration, as opposed to confrontation, has led to many subsequent improvements in the status of women at USU. These accomplishments, initiated by the Ad Hoc Committee, include an improved maternity leave policy, elimination of discrimination in benefits packages, benefits for part-time employees, a part-time tenure policy, a child care center, a Women's Center for Life-Long Learning, the hiring of two women counselors in the counseling center, a Women's Studies Program, improved health care for women students, and resolution of complaints of sex discrimination filed internally by students and employees.

Thirdly, USU's request for special funding from the State Legislature focused attention on faculty salaries at the state level. After observing USU's success in obtaining support from the Board of Regents and the Legislature to correct salary inequities, other state institutions followed USU's example. In addition, colleges and universities in the region have requested assistance from USU in the adaptation of the model to their own institutions and data bases.

Finally, a most important result of using the regression analysis model was the adjustment of some male faculty salaries. Thus, the model has helped USU move towards achievement of its ultimate goal of internal equity in salary administration for all faculty.

Table 1

Analysis of Variance in the First Multiple Regression Report

(1972-1973 Salary Data)

Source	Degrees of Freedom	Mean Square	"F" Ratio
Total	638		
Date, Date^2	2	2407109	1.05
Degree	3	10970210	4.80 (.005)
Tenure	1	672060	.29
Rank	4	116485000	50.95 (.0005)
Sex	1	16450480	7.20 (.01)
Rank X Sex	4	4252824	1.86 (.25)
Race	3	683104	.30
Position	3	92850340	40.61 (.0005)
Teaching	1	7469280	3.27 (.10)
Research Assignment	1	61879430	27.07 (.0005)
Extension Assignment	1	5441889	2.38 (.25)
Other Assignment	1	33946080	14.85 (.0005)
College	7	34362720	15.03 (.0005)
Error	606	2286110	

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